

CLAIMS

What is claimed is:

1. A device comprising:

a housing comprising a chamber and an opening in communication with the chamber;

a nozzle comprising a passageway therethrough and a housing interface,

wherein the housing interface is sized to be positioned within the opening and configured to slidably engage the housing such that when the housing interface is slidably engaged to the housing, the nozzle is translatable from a completely extended position to a completely depressed position, and

wherein the passageway is positioned to be in communication with the chamber when the housing interface is positioned within the opening and slidably engaged to the housing;

a first lock movable from an open position to a closed position,

wherein, when the housing interface is slidably engaged to the housing and the first lock is in the closed position, the first lock inhibits depression of the housing interface of the nozzle further into the housing via the opening of the housing, and

wherein, when the housing interface is slidably engaged to the housing and the first lock is in the open position, the housing interface is uninhibited, by the first lock, from depression further into the housing via the opening of the housing;

a sensor configured to provide a sensor signal indicative of a partially depressed position of the nozzle between the completely extended position and the completely depressed position; and

electrical circuitry configured to move the first lock from the open position to the closed position in response to the sensor signal.

2. The device of claim 1, wherein, when the housing interface is slidably engaged to the housing, the first lock, sensor, and electrical circuitry are completely contained by the housing and nozzle.

3. The device of claim 1, wherein the sensor comprises an optical sensor.

4. The device of claim 1, wherein the housing interface comprises visual features thereon that when moved in relation to the sensor when the housing interface is slidably engaged to the housing causes the sensor to provide the sensor signal indicative of the partially depressed position.

5. The device of claim 1, wherein one or more sensors comprising the sensor are configured to provide sensor signals indicative of a plurality of partially depressed positions each between the completely extended position and the completely depressed position.

6. The device of claim 1,

wherein the housing interface comprises a first angled indentation thereon, and

wherein the first lock comprises a first angled extension that is positioned within the first angled indentation when the first lock is in the closed position and the housing interface is slidably engaged to the housing,

wherein the first angled indentation and the first angled extension are shaped such that when the first lock is in the closed position and the housing interface is slidably engaged to the housing, the first angled extension presses against the first angled indentation to inhibit depression of the housing interface further into the housing and the first angled extension is slidable against the first angled indentation to allow the nozzle to move toward the completely extended position.

7. The device of claim 6,

wherein the housing interface comprises a plurality of angled indentions thereon comprising the first angled indentation, each of the plurality of angled indentions individually aligned orthogonal to a longitudinal axis of the housing and aligned to each other parallel to the longitudinal axis,

wherein the plurality of angled indentions and the first angled extension are shaped such that when the first lock is in the closed position and the housing interface is slidably engaged to the housing, the first angled extension is slidable against each of the plurality angled indentions to allow the nozzle to move toward the completely extended position, and

wherein the angled extension and each of the plurality of angled indentions are shaped such that when the first lock is in the closed position, the housing interface is

slidably engaged to the housing, and the first angled extension is in an angled indentation of the plurality of angled indentations, the first angled extension presses against the respective angled indentation to inhibit depression of the housing interface.

8. The device of claim 1,

wherein the housing comprises a chassis, and

wherein the first lock comprises:

an extension slidably translatable in relation to the chassis to move the first lock between the open and closed positions,

a cam rotatable to slidably translate the extension such that a rotation of the cam is limited by engagement of the cam to the chassis, and

a motor rotatable to move the cam and in communication with the electrical circuitry.

9. The device of claim 1, wherein the nozzle and the housing are separable from each other without damaging the device.

10. The device of claim 9, further comprising:

a second lock movable between an open position and a closed position,

wherein, when the housing interface is positioned within the opening and the second lock is in the closed position, the second lock inhibits the nozzle from extending beyond the completely extended position, and

wherein, when the housing interface is positioned within the opening and the second lock is in the open position, the nozzle is uninhibited, by the second lock, from extending beyond the completely extended position.

11. The device of claim 10, wherein, when the housing interface is positioned within the opening and the second lock is in the closed position, the housing interface cannot be disengaged from the housing without damaging the device.

12. The device of claim 10, wherein, when the housing interface is slidably engaged to the housing and the first lock is in the closed position, the second lock is inhibited from moving from the closed position to the open position.

13. The device of claim 1, further comprising:

a base piece; and

a second lock movable from an open position to a closed position,

wherein the housing comprises the opening in communication with the chamber and a second opening in communication with the chamber,

wherein the base piece is sized to be positioned within the opening and to cover the opening,

wherein, when the base piece is positioned within the opening and the second lock is in the closed position, the base piece is fixed in place by the second lock, and

wherein, when the base piece is positioned within the opening and the second lock is in the open position, the base piece is movable to uncover the opening.

14. A nozzle comprising:

a conical portion extending along a longitudinal axis and comprising:

a dispensing end,

a base end, and

a fluidic passageway extending through the dispensing end and the base end along the longitudinal axis;

an engagement ring extending from the base end and comprising:

a top surface facing toward the dispensing end, and

a bottom surface facing away from the dispensing end;

a housing interface comprising:

an outer surface circumscribing the longitudinal axis,

an upper end affixed to the engagement ring and extending from the bottom surface away from the dispensing end,

an open lower end comprising a perimeter circumscribing the longitudinal axis,

a substantially tubular passageway extending from the upper end through the open lower end, and

an opening in the outer surface;

a spring sized to be positioned within the tubular passageway of the housing interface and engage the base end of the conical portion; and

a retention ring sized to be positioned within the tubular passageway engage the spring when the spring is positioned within the tubular passageway,

wherein, when the spring and retention ring are positioned in the tubular passageway, the ring is movable to compress the spring, and

wherein movement of the ring through the tubular passageway is viewable through the opening in the outer surface of the housing interface.

15. The nozzle of claim 14, further comprising:

an atomizer sized to be positioned within the retention ring,

wherein, when the atomizer is positioned within the retention ring, the housing interface is longitudinally translatable to activate the atomizer.

16. A nasal substance dispenser, comprising:

a housing configured to house a vial of a substance;

a nozzle configured to be inserted into a nostril of a patient and to dispense;

an actuator movable between an extended position and a depressed position, wherein movement of the actuator from the extended position to the depressed position causes at least a portion of the substance in the vial to exit the dispenser through the nozzle; and

a sensor configured to determine a position of the actuator between the extended position and the depressed position.

17. The nasal substance dispenser of claim 16, wherein the sensor is further configured to determine that the actuator is positioned at the depressed position.

18. The nasal substance dispenser of claim 17, wherein the sensor is further configured to determine that the actuator is positioned at an intermediate position between the extended position and the depressed position.

19. The nasal substance dispenser of any of claims 16-18, further comprising a lock, the lock configured to inhibit movement of the actuator upon.

20. The nasal substance dispenser of claim 19, wherein the lock is configured to inhibit movement of the actuator upon a determination by the sensor that actuator moved from extended position to an intermediate position between the extended position and the depressed position.

21. The nasal substance dispenser of any of claims 19-20, wherein the lock is configured to inhibit movement of the actuator in a direction towards the depressed position upon a determination by the sensor that actuator moved from extended position to an intermediate position between the extended position and the depressed position.

22. The nasal substance dispenser of any of claims 19-21, wherein the lock is configured to remain in a locked position until a control signal is received by the dispenser from a remote device, the control signal causing the lock to transition to an unlocked position, the unlocked position permitting movement of the actuator between the extended position and the depressed position.

23. The nasal substance dispenser of any of claims 16-22, wherein the sensor comprises an optical sensor.

24. The nasal substance dispenser of any of claims 16-23, wherein the sensor comprise a limit switch.

25. The nasal substance dispenser of any claims 19-24, wherein the lock is configured to engage an indentation on the actuator to inhibit movement of the actuator.

26. A medicinal vial comprising:

a liquid container;

a nozzle portion comprising a passageway therethrough in communication with the liquid container, the nozzle portion engaged to the liquid container such that depression of the vial in relation to the liquid container causes fluidic movement of contents of the liquid container through the passageway; and

a housing interface comprising:

ratchet shaped indentations thereon, and

high contrast visual features thereon.

27. A nasal substance dispenser, comprising:

a housing comprising a chamber sized to house a vial of a substance;

a nozzle configured to be inserted into a nostril of a patient and to dispense the substance, the nozzle comprising a housing interface sized to slide into and out of the chamber;

a first lock configured such that when closed the housing interface is prevented from disengaging from the housing and such that when opened the housing interface is removable from the chamber,

wherein the vial is removable from the chamber when the housing interface is removed from the chamber and the vial is prevented from being removed from the chamber by the housing interface when the housing interface is engaged to the housing; and

a second lock configured such that when closed the movement of the housing interface within the chamber is inhibited to prevent the nozzle from dispensing the substance and such that when opened the housing interface is slidable within the chamber to allow the nozzle to dispense the substance.